



17767

ADDENDUM TO
DRAFT FEASIBILITY STUDY REPORT
FOR

NL INDUSTRIES/TARACORP SITE
GRANITE CITY, ILLINOIS

AUGUST 1989

prepared by:
U.S. EPA-Region V
January 10, 1990

TABLE OF CONTENTS

<u>Section</u>	<u>Title</u>	<u>Page</u>
1.0	Introduction	1
2.0	Modifications to the draft FS Report	1
	2.1 General Changes	1
	2.2 Specific Changes	7
 <u>Figures</u>		
1	Areas 2 through 8	
2	Taracorp Pile Contours- Alternative H	

1.0 Introduction

The draft Feasibility Study (FS) Report for the NL Industries/Taracorp Site in Granite City, Illinois (NL Site) was submitted to U.S. EPA and Illinois EPA (IEPA) by NL Industries, Inc. (NL) in August 1989. U.S. EPA and IEPA provided comments regarding the draft report to NL on October 3, 1989. No final report was prepared by NL, and some of the comments in the October 3, 1989 letter are presently the subject of a dispute between U.S. EPA and NL. The modifications to the August 1989 draft FS Report listed below are the necessary changes to make the report approvable to U.S. EPA and IEPA, and this Addendum is an integral part of the approved Final FS Report for the NL site.

2.0 Modifications to the RI Report

2.1 General Changes

1. Another alternative, Alternative H, should be added to the draft FS Report, and the text presented below should be inserted in appropriate portions of the document:

Alternative H

Taracorp Pile:	Multimedia Cap, Institutional Controls.
Taracorp Drums:	Off-Site Recovery at a Secondary Lead Smelter.
SLLR Piles:	Excavate and Consolidate with Taracorp Pile.
Venice Alleys:	Excavate Case Material and Consolidate with Taracorp Pile. Restore Surfaces.
Eagle Park Acres:	Excavate Case Material and Consolidate with Taracorp Pile. Restore Surfaces.
Area 1 Unpaved Surfaces:	Excavate Soil and Consolidate with Taracorp Pile. Restore Surfaces.
Areas 2 through 8 Residential Surfaces:	Excavate Soil and Consolidate with Taracorp Pile. Restore Surfaces.
Monitoring:	Air and Groundwater Monitoring, Additional Deep Wells, Contingency Plans.
Estimated Total Remedial Cost: \$13,892,630 Present Worth	
Estimated Months to Implement: 18-30	

Alternative H is identical to Alternative D, with the exception that the scope of off-site soil and waste materials excavation is increased significantly as described below.

All soils in Area 1 with lead concentrations greater than 1000 ppm and residential soils in Areas 2 through 8 with lead concentrations greater than 500 ppm would be excavated and consolidated with the Taracorp pile. Surfaces would be restored with either asphalt or sod, in accordance with present usage.

Refer to Figure 1 for the designations of Area 2 through 8 and Figure 2 for the final contours of the pile per Alternative H. Figure 1 should be inserted in the draft report as Figure 4a, and Figure 2 should be inserted as Figure 9a. Additionally, when comparing the various alternatives with respect to the nine criteria (compliance with ARARs, overall effectiveness, implementability, etc.), Alternative H should be provided with the same text as that which is in the draft FS Report for Alternative D.

U.S. EPA and Illinois EPA (the Agencies) do not believe that 1500 ppm in residential soils and 4800 ppm for industrial areas (as in Alternatives C and D) and use of a predesignated non-analytically based excavation depth of 3 inches are protective of human health and the environment due to direct contact with lead and potential leachability of lead to the ground water. The attached list of documents provides the basis for this determination and the determination that 500 ppm is an appropriate residential soil lead cleanup level at the NL Site. For alternatives which involve excavation of the waste pile (E, F, and G), the attached cleanup objectives (Attachment II) must be used for other metals to determine when excavation is complete.

The increased scope of the residential soil removal presented in Alternative H (i.e. 1000 ppm lead in Area 1 and 500 ppm lead in Areas 2 through 8) should be carried through Alternatives E, F, and G in the draft FS Report. The following text and cost estimates should be inserted in appropriate portions of the documents. The cost calculations and assumptions for alternatives E, F, G, and H comprise Attachment III to this Addendum.

Alternative E

Taracorp Pile:	Multimedia Cap, Supplemental Liner, Institutional Controls.
Taracorp Drums:	Off Site Recovery at Secondary Lead Smelter.
SLIR Piles:	Excavate and Consolidate with Taracorp Pile.
Venice Alleys:	Excavate Case Material and Consolidate with Taracorp Pile. Restore Surfaces.
Eagle Park Acres:	Excavate Case Material and Consolidate with Taracorp Pile. Restore Surfaces.
Area 1 Unpaved Surfaces:	Excavate Soil and Consolidate with Taracorp Pile. Restore Surfaces.
Areas 2 through 8 Residential Surfaces:	Excavate Soil Consolidate with Taracorp Pile. Restore Surfaces.
Monitoring:	Air and Groundwater Monitoring, Additional Deep Wells, Contingency Plans.

Estimated Total Remedial Cost: \$20,566,242 Present Worth
Estimated Months to Implement: 36-48

To implement Alternative E, drums containing lead drosses and other production by-products would be removed to an off-site secondary lead smelter for lead recovery. An impermeable liner would then be installed on a section of Area 1 adjacent to the Taracorp pile. All soils in Area 1 with lead concentration greater than 1000 ppm would be excavated prior to liner installation, with the excavated soil staged with the Taracorp pile. The liner would consist of 2 feet of clay, 1 foot of sand (secondary drainage layer), a 60 mil synthetic membrane, and 1 foot of sand (primary drainage layer). A primary and secondary leachate collection system (perforated PVC piping) would also be provided. Excavated soils from Areas 1 through 8 would be placed over the primary drainage layer as a base to protect the liner from damage. Following liner construction, waste materials from the Taracorp pile, SLIR piles, Eagle Park Acres, and Venice Alleys would be excavated, transported to and placed on the liner. These wastes would be covered and graded with soils excavated from the base of the former Taracorp pile. A multimedia cap would then be installed over the consolidated pile. All construction activities in area 1 mentioned above would comply with any applicable floodplain construction permit requirements. Institutional controls such as site access restrictions, restrictive covenants, deed restrictions, and property transfer restrictions would also be implemented.

As discussed above, battery case material would be excavated from both Venice Alleys and Eagle Park Acres and transferred to the newly constructed liner. These areas would be restored with either asphalt or sod, in accordance with current usage.

Residential soils in Areas 2 through 8 (see figure 4a) with lead concentrations greater than 500 ppm would be excavated and restored with either asphalt or sod, in accordance with present usage. As stated above, excavated soil would be transported to the newly constructed liner and placed directly over the primary drainage layer, to protect the synthetic membrane from damage from heavy slag and debris.

Air and ground water monitoring included in the no action alternative would be implemented as part of Alternative E.

Alternative F

Taracorp Pile:	Multimedia Cap, Supplemental Liner, Recovery of plastic Battery Case Materials and Lead, Institutional Controls.
Taracorp Drums:	Off-Site Recovery at Secondary Lead Smelter.
SLLR Piles:	Excavate and Consolidate with Taracorp Pile.
Venice Alleys:	Excavate Case Material and Consolidate with Taracorp Pile. Restore Surfaces.
Eagle Park Acres:	Excavate Case Material and Consolidate with Taracorp Pile. Restore Surfaces.
Area 1 Unpaved Surfaces:	Excavate Soil and Consolidate with Taracorp Pile. Restore surfaces.
Areas 2 through 8 Residential Surfaces:	Excavate Soil and Consolidate with Taracorp Pile. Restore surfaces.
Monitoring:	Air and Groundwater Monitoring, Additional Deep Wells, Contingency Plans.

Estimated Total Remedial Cost: \$34,342,284 Present Worth
Estimated Months to Implement: 60-72

Alternative F is identical to Alternative E, with the exception of recycling a portion of the waste materials as described below.

Prior to transport to the newly constructed liner, waste materials in the Taracorp pile would be processed to recover plastic battery case material and smeltable lead. During the initial excavation, waste material would be visually segregated: excavations containing primarily slag would be transported directly to the adjacent liner; those containing significant amounts of plastic battery case material and smeltable lead would be transported to an on-site segregation unit. The commercially available unit would utilize flotation as a recovery mechanism. Recovered plastic would be shipped off-site for use as a raw material. Recovered lead and lead oxide would be shipped to a secondary smelter after drying. Residuals, including slag and rubber case material, would be transported to the liner.

Alternative G

Taracorp Pile:	Recovery of Plastic Battery Case Material and Lead, Disposal of Residuals in RCRA Landfill.
Taracorp Drums:	Off-Site Recovery at a Secondary Lead Smelter.
SLIR Piles:	Disposal in RCRA Landfill.
Venice Alleys:	Excavate Case Material, Disposal in RCRA Landfill. Restore Surfaces.
Eagle Park Acres:	Excavate Case Material, Disposal in RCRA Landfill. Restore Surfaces.
Area 1 Unpaved Surfaces:	Excavate and Restore. Disposal in RCRA Landfill.
Area 2 through 8 Residential Surfaces:	Excavate and Restore. Disposal in RCRA Landfill.
Monitoring:	Ground water Monitoring, Additional Deep Wells, Contingency Plan.

Estimated Total Remedial Cost: \$56,514,070 Present Worth
Estimated Months to Implement: 60-72

To implement Alternative G, drums containing lead drosses and other production by-products would be removed to an off-site secondary lead smelter for lead recovery. The remaining waste materials in the Taracorp pile would be excavated, processed to recover recyclable plastic, and disposed of in a RCRA landfill.

Processing would consist of visual segregation during initial excavations to separate non-plastic bearing wastes from wastes containing plastics. Non-plastic bearing waste would be transported directly to the RCRA landfill; those containing significant amounts of plastic battery case material and smeltable lead would be transported to an on-site segregation unit. The commercially available unit would utilize flotation as a recovery mechanism. Recovered plastic would be shipped off-site for use as a raw material. Recovered lead and lead oxide would be shipped to a secondary smelter after drying. Residuals, including slag and rubber case material, would be transported to the RCRA landfill.

Battery case material would be excavated from both Venice Alleys and Eagle Park Acres and transported directly to the RCRA landfill. It is thought that these casings are primarily rubber and therefore, not likely suitable for recycling. If significant amounts of plastic casings were excavated, however, they would be processed in the same fashion as the Taracorp pile casings. Venice Alleys and Eagle Park Acres surface areas would be restored with either asphalt or sod, in accordance with current usage.

Unpaved portions of Areas 1 through 8 would be excavated and restored with either asphalt or sod, in accordance with present usage. Excavated soil from Area 1 would be transported to a RCRA landfill; excavated soil from Areas 2 through 8 would be transported to a RCRA or non-RCRA landfill, based on the results of preliminary EP Toxicity tests for lead.

The groundwater monitoring included in the no action alternative would also be implemented as part of Alternative G. Long term air monitoring would not be required.

2. Alternative C is nearly identical to Alternative D and should be deleted from the list of Alternatives.
3. Due to the fact that an Addendum for the RI Report for the NL Site (Attachment IV) was written by U.S. EPA and IEPA, all statements in the draft FS Report regarding Risk Assessment findings and associated text (e.g. description of No Action Alternative, summary of Overall Effectiveness of each alternative, etc.) should also include a comparison of the relevant facts to the perspective presented in the attached RI Addendum.
4. A minimum of four additional deep monitoring wells (one upgradient, three downgradient) should be installed as part of the ground water monitoring program. For alternatives A through D at least 2 wells are necessary between the Taracorp property and Tri-City Trucking property, and another well is necessary on Taracorp property at the south end of the pile. Additionally, a monitoring program for a minimum of 30 years should be established, and it should be mentioned that a Contingency Plan will be developed for remedial action in the event that site-related ground water contaminant levels exceed applicable concentration limits. The list of analytical parameters for all ground water samples should include all of the parameters which have been detected in the waste pile since the deeper ground water has not yet been sampled.
5. During construction activities, additional air monitoring stations should be established to quantify air lead levels in vicinity and gauge the effectiveness of dust suppression techniques being employed. For all remedial alternatives NL proposes to review IEPA air monitoring data annually and prepare a report. Only two IEPA monitoring sites remain and one may be lost in the near future. One or two monitoring sites would not be adequate to detect all, if any, risks to the public or the environment. Prior to commencement of the remedial action an air monitoring plan must be approved by the Agencies. The plan should include descriptions of monitoring locations, frequency of sampling, methodology, equipment, parameters, quality control, and a Contingency Plan for remedial action in the event that air lead levels exceed the NAAQS for lead.

The use of any treatment technologies which could include solidification/stabilization/fixation, recycle/recovery, thermal treatment and chemical/physical treatment technologies would normally require air pollution control permits from the IEPA Division of Air Pollution Control. For CERCLA on-site actions demonstrations of compliance with the substantive construction permit and operation permit requirements is required before any physical construction begins or operations commence. A demonstration must be made to show compliance with applicable rules and regulations. In Illinois, there are no source emission standards for lead but there is an ambient air quality standard. As a result, a demonstration must be made that the project does not cause or contribute to an air quality standard violation. This can only be achieved by submitting the results of detailed dispersion modeling and a complete air quality assessment. If the project is to last more than two years then compliance with the federal Prevention of Significant Deterioration (PSD) Rules must be achieved. A PSD permit would be required if the project is significant as determined by annual emission of 0.6 ton lead (12 month running average). The PSD permit process includes formal public notice (and hearing) and the opportunity for U.S EPA approval. If Taracorp's operating facility plans to increase through put as a result of remedial action, a permit modification is also required. Significant modifications are also subject to PSD rules. A PSD permit process requires considerable effort both by the applicant and by the Agency. Time frames for permit insurance will exceed 6 months, often exceed one year and if remanded by U.S EPA can take years. One important requirement of the PSD permit is that the project demonstrates "Best Available Control Technology" which is specified on a case-by-case basis by IEPA.

6. Land Disposal Restrictions (35 IAC Part 728) are applicable to Alternatives F and G and may be applicable to Alternatives B, C, D, and E depending on what is defined as a "unit" at the site.
7. ARARs. The 35 IAC Part 724 Subpart L waste pile regulations and Subpart F ground water monitoring regulations are applicable to Alternative B,C,D,E,F, and G. The following requirements are also applicable to Alternative F: 35 IAC Part 724 Subpart J: Tanks, and Subpart X: Other.

2.2. Specific Changes

1. Page ES-4, line 1 -";however, monitoring of ground water must be performed". should be inserted after "justified".
2. Page ES-4, Second full paragraph, last sentence - this sentence should be amended to read: "These alternatives can meet the ARARs".
3. Page ES-4, Last paragraph and Page ES-5 - This material should be deleted. The appropriate remedial alternative will be selected in the Proposed Plan.

4. Page 7, first sentence - the end of this sentence should be amended to read: "extractable, therefore, this material is not a characteristic waste under 40 CFR 261."
5. Pages 16 and 17 Ground Water. The U.S. EPA Ground Water Protection Strategy discussed here has not been adopted by, and is therefore not applicable in, the State of Illinois. Discussion of this strategy should be deleted. Note that the concentrations of total dissolved solids and sulfates in ground water beneath the site do not preclude its use as a source of drinking water as it meets the requirement of 35 IAC Subtitle F: Public Water Supplies, with the exception of manganese. The concentration of manganese in downgradient G108 is 25 times higher than upgradient G110 indicating that the site has contributed to manganese concentrations in ground water.
6. Page 20, section 1.6.3 Flood Plain Regulations. The proposed liner location shown on figure 10 is partially in the 100 year flood plain (Insurance Rate Map of U.S. Department of Housing and Urban Development, June 1, 1978). Therefore, the following is a location specific applicable requirement for Alternative E and F: Illinois Revised Statutes; Chapter 19; Paragraph 65(f) and (g): Flood Plains Construction Permits. A figure should be added to the FS report to show the 100 year flood plain in the vicinity of the site.
7. Page 23, line 8 - "and to provide remediation in the event that these standards are exceeded." should be added at the end of this line.
8. Page 23, line 10 - "the NAAQS for lead, which is presently" should be inserted between "than" and "1.5 ug".
9. Page 48, treatment of "Area 2 unpaved surfaces" and "Area 3 unpaved surfaces" - Disposal in non-RCRA landfill would only be acceptable if additional EP toxicity samples so indicate.
10. Page 52, First full paragraph - it should be stated here that sod in Venice Alleys would not virtually eliminate the potential for direct contact with waste materials and topsoil and sod over contaminated soils in Areas 1, 2, and 3 would not effectively limit the migration of contaminants.
11. Page 52, Alternative C paragraph, line 8 - "eliminated" should be "minimized".
12. page 55, second sentence - the calculations and basis indicating a volume reduction of 10% should have been provided.
13. Page 65, Section 4.2.3, line 6 - "very" should be "somewhat".
14. Page 67, Section 4.3.1, line 3- "ground water," should be deleted from this line.

15. Page 67, Section 4.3.1, line 7 - "in the short term." should be added to the end of this line.
16. Page 67, Section 4.3.1, line 10- "and may not be possible to achieve". should be added to the end of this line.
17. Page 68, Section 4.3.3, line 2 - "excellent" should be "good".
18. Page 69, first sentence -"with the exception of the potential for future ground water releases," should be added to the end of this sentence.
19. Page 69, line 9 - "with the possible exception of the ground water objective," should be added to the end of this line.
20. Page 69, line 12 - "and limiting the migration of metals to ground water." should be deleted from this line.
21. Page 69, line 13 - more documentation (assumptions used, etc.) should have been provided for the computer model. The figure of 99.99% initially seems suspect and can only be used if thoroughly and accurately documented.
22. Page 70, Remote Areas, second sentence - "although" should be deleted from and "not" should be inserted between "would" and "be" in this sentence.
23. Page 71, line 16 - "would" should be "may"
24. Sections 4.3.4, 4.4.4, 4.5.4 and 4.6.4. This evaluation criteria is used in appropriately in these sections to evaluate the reduction of mobility of contaminants by containment rather than by treatment. In reference to the criteria "Reduction of Toxicity, Mobility or Volume Through Treatment", the Guidance for Conducting RI/FSs (October 1988) indicates that "This evaluation criteria addresses the statutory preference for selecting remedial actions that employ treatment technologies that permanently and significantly reduce the toxicity, mobility or volume of the hazardous substances as their principal element." These sections should only discuss reductions attained through using treatment technologies.
25. Page 72 - It should be mentioned in the first two paragraphs that there is no volume or toxicity reduction with this alternative.
26. Page 73, First full paragraph - the time estimates in this paragraph and for portions of the other remedial alternatives seem excessive and should have been more realistic.
27. Page 76, line 7 - "somewhat" should be inserted between "being" and "protective".
28. Page 76, line 10- "would" should be "may".

29. Page 79, Area 3, line 2 "good" should be "fair".
30. Page 93, section 4.6.3, Location Specific ARARs. See comment number 6.
31. Page 96, First paragraph - it should be mentioned that water used for dust suppression during extensive excavation would generate significant quantities of runoff that would have to be managed and would temporarily increase percolation through the waste materials.
32. Page 98, Section 4.6.7, line 1 - "highly" should be deleted from this line.
33. Page 99, Section 4.7.1, line 12- "potentially" should be inserted between "being" and "poorly".
34. Page 102, Section 4.7.2, Location Specific ARARs. See comment number 6.
35. Page 111, Section 4.8. The description of Alternative G indicates that slag and rubber casing would be transferred to the lined disposal area and waste material would then be capped using a multimedia cap. This description differs from table 13 which correctly indicates that waste will either be taken to an off-site RCRA or non-RCRA landfill.
36. Page 114, Action Specific ARARs. The text indicates that the multimedia cap, supplemental bottom liner, and leachate collection and treatment system could be constructed to meet the ARARs however, Alternative G does not actually include these components.
37. Page 124, First full paragraph, last sentence - this sentence should be deleted.
38. Page 124, last two sentences - these sentence should be deleted. The second-to-last sentence could be included in the Cost section.
39. Page 125, line 1 - "slightly" should be inserted between "would" and "reduce".
40. Page 125, line 8 - this line should read: "plastic may not pass the TCLP test for lead."
41. Page 125, Section 4.9.5, line 8 - "unproven" should be deleted from this line.
42. Page 126, Section 4.9.6, second sentence - "which are unproven for this type of situation. should be deleted from the end of this sentence.

43. Page 126, Section 4.9.6, lines 9 and 10 - "would not be expected to" should be "may not".
44. Page 128, Second full paragraph, second sentence through end of text on page 129 - this material should be deleted.
45. Table 5, Federal Drinking Water Standards Column - the MCL for chromium, total is .05 mg/L. There is no separate standard for chromium VI and chromium III. The secondary MCL for copper is 1 mg/L, not .01 mg/L.
46. Figure 9. Steep sideslopes do not limit the use of a RCRA multimedia cap that includes a flexible membrane liner (FML). Therefore, the designs consultant must carefully address site conditions that may limit or prevent the use of such a cap. The proposed contours and design shown on figure 9 do not allow compliance with RCRA requirements. The space between the waste pile and southeast property boundary should be maintained to allow placement of monitoring wells on the site and downgradient of the pile (see comment number 3). The base of the landfill would have to be extended to the northwest to maintain the space for monitoring wells and to obtain appropriate slopes for a cap with a flexible membrane liner. The above measures would eliminate the need for the "wall" shown on figure 9 and the problems associated with it.

All modifications for previous alternatives should carry through to similar text for subsequent alternative and applicable figures and tables.

ATTACHMENT I
LIST OF DOCUMENTS SUPPORTING
500 PPM RESIDENTIAL SOIL CLEANUP LEVEL

<u>TITLE</u>	<u>AUTHOR</u>	<u>DATE</u>
1. "Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites"	Henry L. Longest, U.S. EPA, OERR	9/7/89
2. "Cincinnati Soil Lead Demonstration Project Work Plan"	University of Cincinnati Medical Center	April 1989
3. "Lead in Soil: Recommended Maximum Permissible Levels"	S. Madhavan, K. Rosenman, T. Shehata	March 1988
4. "Reducing Lead Uptake in Lettuce"	N. L. Bassuk	August 1985
5. "A Study of Soil Contamination and Plant Lead Uptake in Boston Gardens"	T. Spittler, W. Feder, U.S. EPA Region I	1979
6. Record of Decision - United Scrap Lead Site - Troy, Ohio"	U.S. EPA Region V	9/30/88
7. 1988 and 1989 Records of Decision involving residential and industrial soil lead contamination	Various U.S. EPA Regions	Various 1988 and 1989

Attachment II

Cleanup Objectives
TARACORP
Granite City, Illinois

On-Site Soils/

Parameter	Groundwater Objective (µg/l)	Objective (µg/l) ¹	Objective Basis	ADL ² - Water (µg/l)	ADL ² - Soil (µg/l) ¹
Antimony	146	146	AWQC	60	60
Arsenic	1000	1000	35 IAC 302.208	10	10
Barium	5000	5000	35 IAC 302.208	200	200
Cadmium	50	50	35 IAC 302.208	2	2
Chromium III	1000	1000	35 IAC 302.208	10	10
Chromium VI	50	50	35 IAC 302.208	10	10
Copper	20	20	35 IAC 302.208	25	25
Iron	1000	1000	35 IAC 302.208	100	100
Manganese	1000	1000	35 IAC 302.208	15	15
Mercury	0.5	0.5	35 IAC 302.208	0.2	0.2
Nickel	1000	1000	35 IAC 302.208	40	40
Selenium	1000	1000	35 IAC 302.208	5	5
Silver	5	5	35 IAC 302.208	10	10
Zinc	1000	1000	35 IAC 302.208	20	20
Sulfate	500000	NA ³	35 IAC 302.208	1000	NA ³
Total Dissolved Solids	1000000	NA ³	35 IAC 302.208	Not Available	NA ³

Parameter	Off-Site Soils Objective (mg/kg)	Objective Basis	ADL ² - Soil (mg/kg)
Lead	500	Centers for Disease Control	0.100

¹ Based upon EP Toxicity.

² ADL - Acceptable Detection Limit. Acceptable Detection Limits have been set by CROPA for those substances where health or environmentally based cleanup objectives are below commonly attainable analytical detection limits. The stated cleanup objectives remain the goals; however, the Agency will accept analyses as proof of acceptable cleanup if they: show no detection, have a detection limit at, or below, the Acceptable Detection Limit, and are consistent with SW 846 quality assurance criteria.

³ NA - Not Applicable.

CAS/A/021/psf

ATTACHMENT III

Cost Calculations for Alternative H

exact Granite City block size: 45' or 50' X 125'
 large = 17 residences /block
 small = 12 residences /block

#blocks in areas 2-8: large: 19
 small: 75

best estimate of #blocks residential in
areas 2-8: large: 14
 small: 44

assumption: 6" removal depth to achieve 500 ppm lead cleanup level
assumption: square blocks (12th + Greenfield) = small blocks

total quantity available

$$\begin{aligned} &= (14 \text{ large blocks} \times 17 \text{ residences/block} \times 47.5' \times 125' + 44 \text{ small blocks} \\ &\quad \times 12 \text{ residences/block} \times 47.5' \times 125') \times .5' \text{ soil/residence} \\ &= (14413125 \text{ sq ft} + 3135000 \text{ sq ft}) \times .5' \\ &= 2274062.5 \text{ ft}^3 \\ &= 84,225 \text{ yd}^3 \end{aligned}$$

assumption: of a typical residence, only 2/3 of surface area will need to be excavated due to paving and structures, etc.

quantity to be actually removed =
(84,225) 2/3 = 56,150 yd³

Cost Calculation of Areas 2-8 vs. just Areas 2 + 3 (i.e., Alternative D, Table 17 of FS)

Taracorp Pile - assumption: 1/3 increase in surface area of pile
therefore: 712,760 X 1.333 = \$950,110

Areas 2-8 vs. Areas 2 + 3

assume: with Areas 2-8, soil quantity is quadrupled + # of yards to be excavated is doubled

therefore:

clear/replace = 179,000 X 2 =	\$ 358,000
manual excav. = 210,500 X 2 =	\$ 421,000
light equip excav.= 278,000 X 4 =	\$1,112,000
load + transport = 86,000 X 4 =	\$344,000
buy/haul/place (top)= 350,000 X 4 =	\$1,400,000
buy/haul/place (the rest) = 510,000 X 2 =	\$1,020,000
base course/asphalt = 590,000 X 2 =	\$1,180,000

therefore: total 2-8 = \$5,835,000

Area 1 with 1000 ppm excavation:

assumption: volume will triple

therefore: excavation-manual = 9600 X 3	= \$ 28,800
-light equip = 72,810 X 3	= \$218,430
-heavy equip = 57,280 X 3	= \$171,840
load transport = 32,800 X 3	= \$ 98,400
base course = 217,600 X 3	= \$652,800
3" topsoil = 63,680 X 3	= \$191,040

the other costs remain the same.

therefore: Area 1 cost with 1000 ppm excavation
= \$1,662,750

Other Costs

add \$150,000 for decon, mobilization, and dust control
= \$416,800 total

Therefore: total cost	= \$950,110
+	\$ 6,500
+	\$109,760
+	\$106,840
+	\$118,580
+	\$ 1,662,750
+	\$ 5,835,000
+	<u>\$ 416,800</u>
=	\$ 9,206,340

	\$9,206,340
+indirect cost @ 45%	= \$13,350,000
+ O&M	= <u>\$ 542,630</u>
	= \$13,892,630
differential from Alt. D	= \$7,057,180

Effect of 1000 ppm/500 ppm soil cleanup level on other alternatives:

Alternative E:

Capital:	\$ 20,023,612
O&M:	<u>\$ 542,630</u>
Total =	\$ 20,566,242

Alternative F:

Capital:	\$ 33,799,654
O&M:	<u>\$ 542,630</u>
Total =	\$ 434,342,284

Alternative G:

Capital:	\$ 56,432,600
O&M:	<u>\$ 81,470</u>
Total =	\$ 56,514,070

Attachment IV
RI Report Addendum

JAN 10 1989

5HS-11

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Stephen W. Holt
Project Coordinator
Environmental Control Dept.
NL Industries, Inc.
P.O. Box 1090
Hightstown, NJ 08520

Dear Mr. Holt:

Pursuant to Paragraph 17 of the Remedial Investigation/Feasibility Study (RI/FS) Administrative Order by Consent (Order), the U.S. Environmental Protection Agency (U.S. EPA) and Illinois EPA hereby approve the September 1988, RI Report with the necessary changes presented below. If NL Industries does not respond to these changes within 15 calendar days of receipt of this letter, then the September 1988 RI Report, with necessary changes, shall be considered an integral and enforceable part of the RI/FS Order. The following are necessary changes to the September 1988 RI Report.

1. It shall be noted that U.S. EPA and Illinois EPA disagree with the last two sentences of the "Risk Assessment" Paragraph on page E-5 and the fifth sentence in the last paragraph on page 84.
2. It shall be noted in the second paragraph on page 83 and the last paragraph of page 84 that i) U.S. EPA and Illinois EPA contend that due to the absence of a toxicity value for lead in soil, a quantitative risk assessment cannot be performed at the present time for lead in soil, ii) in lieu of a quantitative risk assessment for lead in soil, U.S. EPA and Illinois EPA have adopted the recommendation of the Center for Disease Control, namely: "In general, lead in soil and dust appears to be responsible for blood lead levels in children increasing above background levels when the concentration in soil or dust exceeds 500-1000 ppm.," and iii) since several samples in the residential areas east of the site and in the remote fill areas in Venice and Eagle Park Acres exceeded 500-1000 ppm lead, U.S. EPA and Illinois EPA contend that a potential unacceptable risk to public health exists in these areas.

3. It shall be noted that with respect to remedial response objectives and criteria discussed on page 87 and table 10, U.S. EPA and Illinois EPA contend that the remedial response objectives and criteria will be determined by the Center for Disease Control recommendation, current toxicity data, and current policy, as well as by the risk assessment in the RI Report.

The specific problems that U.S. EPA and Illinois EPA observed with the three risk assessment approaches presented in the RI Report are outlined in the attachment to this letter. This letter, the November 4, 1988 letter from U.S. EPA to ML Industries, the December 16, 1988 letter written by Bonnie Fine Kaufman, Counsel for ML Industries, and any new material regarding the toxicity of lead will be part of the Administrative Record for review with respect to the Record of Decision for the ML Industries-Granite City, Illinois Site.

Please contact me at (312) 886-4742 if you have any questions concerning this letter.

Sincerely yours,

Brad Bradley
U.S. EPA Project Coordinator

Attachment

cc: Ken Miller, IEPA
Nancy Mackiewicz, IAG
Frank Hale, OB & G

bcc: B. Kush, IL/IN #3
R. Grimes, 5CS-TUB-03
D. Dolan, 5HS-13

*PS 47 - 500 - 512
Certified mail*

File:c-1Holt.D#7;myr;RERB;IL/INUnit3;(Bradley)12/27/88

Attachment to approval letter

Remedial Investigation Report
Granite City Site
Granite City, Illinois
September 1988

Introduction

The Remedial Investigation Report (RI) was completed by O'Brien and Gere Engineers, Inc. for NL Industries, Inc. under a Consent Order with USEPA and

IEPA. The USEPA and IEPA have provided oversight during the performance of the required work. The two agencies believe that this report accurately presents the site conditions with the exceptions noted in the approval letter.

The primary problems the IEPA and USEPA observe with the report lie in the assessment of risks associated with contaminants (presented in Section 8) and

the conclusions drawn from this assessment. The Risk Assessment was conducted

by O'Brien and Gere using the following three approaches:

1. The Illinois Department of Public Health Blood Lead Survey Approach;
2. The Acceptable Daily Intake Approach;
3. Soil Lead-Blood Lead Correlation Approach.

The methodology and/or assumptions used in these approaches is flawed or inappropriately used as summarized and specifically discussed below.

The Blood Lead Survey cannot be used to support the report's conclusion of no unacceptable human health impacts in light of its limitations.

The Acceptable Daily Intake Approach is fundamentally flawed and cannot be used in assessing the risks associated with exposures to lead. The toxicity data needed for this approach is under revision and therefore cannot be used.

The Soil Lead-Blood Lead correlation approach used in the risk assessment does not reflect a worst case scenario by using a conservative correlation ratio.

The conclusion presented in the report i.e., "risk assessment indicates no unacceptable impacts to human health from lead on the Site or in the surrounding community" is not supported by the site data or the risk assessment in light of the associated problems.

The Illinois Department of Public Health Blood Lead Survey Approach: The Illinois Department of Public Health (IDPH) cross-sectional blood lead survey of 1982 does not provide adequate evidence to support the RI report's conclusion that there are no unacceptable impacts to human health from lead in the area around the site. The 1982 blood lead survey was strictly a screening mechanism. The sample timing (Nov. and Dec. 1982) cannot be considered a peak exposure period and the relatively small sample size limits the extent to which conclusions can be extrapolated to the rest of the population in the area. Generally the blood lead of a population tends to be highest in the late summer or fall, however, there is considerable variation among communities, depending on the local climate and terrain. There are several published studies which would allow one to estimate the magnitude of this relationship in a population. The rate of decline from the peak blood lead ranges from 2.3 - 8.8 percent/month. A reasonable estimate is approximately percent/month. Thus, one could estimate that the mean blood lead level in the Granite City population would have been 15-20 percent higher had the survey been conducted in the late summer or fall, instead of in November and December.

The Acceptable Daily Intake Approach: The Acceptable Daily Intake (ADI) Approach taken in the risk assessment for lead is not supported by the USEPA or IEPA at the present time.

This approach is inappropriate since the Acceptable Intake for Chronic oral exposure (AIC) value in the Superfund Public Health Evaluation Manual (EPA/540/1-86/060, October 1986) was withdrawn by the Agency because of concerns regarding its adequacy. The use of an "adjusted" AIC (60% of AIC) based on the withdrawn AIC for risk assessment purposes is not appropriate since it appears that some health effects of lead, particularly changes in the levels of certain blood enzymes and in aspects of children's neurobehavioral development, may occur at blood lead levels so low as to be essentially without a threshold. The development of a revised AIC is under review by USEPA at this time. Once a revised AIC is issued, a properly conducted ADI approach can be used for lead.

Soil Lead-Blood Lead Correlation Approach: The rationale for rejection of the soil lead-blood lead approach in the Risk Assessment is as follows: a number of researchers have conducted studies which describe the positive relationship between lead in soil and children's blood lead and have constructed multiple linear regression models that show soil lead frequently contributes to explaining children's blood lead levels. A range of values for the slope of the relationship between soil lead and children's blood lead levels are found. The soil lead-blood lead correlation approach developed in the Risk Assessment simply takes a slope from the lower end of this range of

slopes (2 ug/dl increase in blood lead per 1000 ppm soil lead). Use of a higher slope value from the literature (6.8 ug/dl), which is equally justifiable, would yield tolerable soil lead levels in the 500-1000 ppm range (735 ppm) recommended by the Center for Disease Control.